CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 :2005

T-2377

Job No.: CTCE/BBMP/W.No.08/HJSR/CSR-06/072b/CEMENT/2016-17 Date: 24.06.2016

TEST REPORT ON CEMENT

* CUSTOMER	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
*AGENCY	:	**Mr. H.J. Sanjay Reddy,** # 4, 9th K Main, Hosahalli, Vijayanagara, Bangalore - 40.
*NAME OF THE WORK	:	Improvements to cross roads and drains near Kalpathuru Apartments and Srinidhi Badavane Opp. to Tatanagar in Ward No. 08, Kodigehalli Sub Division, BBMP, Bangalore.
REFERENCE	:	BBMP/EE/BTP/WO/333/2015-16 Dated: 24.03.2016
SAMPLE ID	:	Cement
SAMPLE RECEIVED ON	:	22.06.2016
PERIOD OF TESTING	:	22.06.2016 to 24.06.2016

The results of the tests conducted on the cement sample are as follows:

Sl. No	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 8112-2013
1	Standard Consistency	IS-4031 (Part -4) 1988(RA-2009)	28.00 %	-
2	a) Initial Setting Time	IS-4031 (Part -5) 1988(RA-2009)	195 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part -5) 1988(RA-2009)	460 Minutes	Not More than 600 Minutes
3	Soundness by Le Chartlier Method	IS-4031 (Part-3) 1988(RA-2009)	1 mm	Not more than 10mm

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Quality Manager

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Job No.: CTCE/BBMP/W.No.08/HJSR/CSR-06/072b/SAND-Gradation/2016-17 : 24.06.2016

TEST REPORT ON DETERMINATION GRADATION OF FINE AGGREGATES

*** Customer** : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

*** Agency** : **Mr. H.J. Sanjay Reddy,**
# 4, 9th K Main, Hosahalli, Vijayanagara, Bangalore - 40.

*** Name of Work** : Improvements to cross roads and drains near Kalpatharu Apartments and Srinidh Badavane Opp. to Tatanagar in Ward No. 08, Kodigehalli Sub Division, BBMP, Bangalore.

Reference : BBMP/EE/BTP/WO/333/2015-16 Dated: 24.03.2016

Technical Reference : IS : 2386 Part 1 - 1963 RA-2007

Sample ID : Fine Aggregates

Sample Received on : 22.06.2016

Date of Testing : 24.06.2016

Total Wt. of Aggregates in gms **1000**

Is Sieve Size in mm	Cumulative Weight Passing in %	Spec.Limits as per IS 383-1970 (RA- 2007)			
		Zone-I	Zone-II	Zone-III	Zone-IV
10	100	100	100	100	100
4.75	92.75	90-100	90-100	90-100	95-100
2.36	77.02	60-95	75-100	85-100	95-100
1.18	49.56	30-70	55-90	75-100	90-100
600 Micron	19.91	15-34	35-59	60-79	80-100
300 Micron	8.38	5-20	8-30	12-40	15-50
150 Micron	2.50	0-10	0-10	0-10	0-15

* Information is furnished by the Customer/Representative

Remarks : This sample is under Zone-I specific limits.

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Job No.: CTCE/BBMP/W.No.08/HJSR/CSR-06/072b/AGG/GR/2016-17 : 24.06.2016

TEST REPORT ON COARSE AGGREGATES

* Customer	: **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
* Agency	: **Mr. H.J. Sanjay Reddy,** # 4, 9th K Main, Hosahalli, Vijayanagara, Bangalore - 40.
* Name of Work	: Improvements to cross roads and drains near Kalpatharu Apartments and Srinidhi Badavane Opp. to Tatanagar in Ward No. 08, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	: BBMP/EE/BTP/WO/333/2015-16 Dated: 24.03.2016
Technical Reference	: IS : 2386 Part 1 -1963 RA-2007
Sample ID	: Coarse Aggregates (40mm)
Sample Received on	: 22.06.2016
Date of Testing	: 24.06.2016

Total Wt. of Aggregates in gms= **7000**

Is Sieve Size in mm	Cumulative Weight Passing in %	Spec.Limits as per IS 383-1970 (RA- 2007)	
		Graded	Single Sized
80	100	100	-
63	100	-	100
40	96.39	95-100	85-100
20	35.17	30-70	0-20
10	16.01	10-35	0-5
4.75	1.97	0-5	-

* Information is furnished by the Customer/Representative

Remarks : This sample is under Graded specific limits.

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Job No.: CTCE/BBMP/W.No.08/HJSR/STEEL/2016-17 24.06.2016

TEST REPORT ON REINFORCEMENT STEEL

Customer	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	:	**Mr. H.J. Sanjay Reddy,** # 4, 9th K Main, Hosahalli, Vijayanagara, Bangalore - 40.
Name of the Work	:	Improvements to cross roads and drains near Kalpatharu Apartments and Srinidhi Badavane Opp. to Tatanagar in Ward No. 08, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	:	BBMP/EE/BTP/WO/333/2015-16 Dated: 24.03.2016
Date of Test	:	24.06.2016
Technical Reference	:	IS: 1786-2008

Sl. No	Nominal size (dia) (mm)	Mass per metre (Kg/mtr)	TENSILE STRENGTH			Bend Test	Rebend Test
			0.20% proof stress/Yield stress N/mm^2	Tensile strength (Ultimate stress) N/mm^2	Elongation percent gauge length		
1	12	0.89	517	561	13.55	O.K	O.K

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T-2377

Job No.: CTCE/BBMP/W.No.08/HJSR/CSR-06/072b/CUBE/2016-17 26.07.2016

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

*** Customer** : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

*** Agency** : **Mr. H.J. Sanjay Reddy,**
# 4, 9th K Main, Hosahalli, Vijayanagara, Bangalore - 40.

*** Name of the work** : Improvements to cross roads and drains near Kalpatharu Apartments and Srinidhi Badavane Opp. to Tatanagar in Ward No. 08, Kodigehalli Sub Division, BBMP, Bangalore.

Reference : BBMP/EE/BTP/WO/333/2015-16 Dated: 24.03.2016

*** Sample ID** : Drain Concrete

Size of cubes : 150mmx150mmx150mm

Cross Sectional Area : 22500 mm^2

Technical Reference : IS: 516-1959 (Reaffirmed 2008)

*** Grade of Concrete** : M_{20}

Compressive Strength as on : 28^{th} day

Sample Received on : 26.07.2016

Sl.No.	* Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	28.06.2016	26.07.2016	8.232	482.6	21.45
2	28.06.2016	26.07.2016	8.345	496.8	22.08
3	28.06.2016	26.07.2016	8.412	515.8	22.92

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Job No.: CTCE/BBMP/W.No.08/HJSR/WMM/Gradation/2016-17

04.07.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

Agency : **Mr. H.J. Sanjay Reddy,**
4, 9th K Main, Hosahalli, Vijayanagara, Bangalore - 40.

Name of Work : Improvements to cross roads and drains near Kalpatharu Apartments and Srinidhi Badavane Opp. to Tatanagar in Ward No. 08, Kodigehalli Sub Division, BBMP, Bangalore.

Reference : BBMP/EE/BTP/WO/333/2015-16 Dated: 24.03.2016

Date of Testing : 04.07.2016

Material : WMM

Sample ID : WMM Layer

Oven Dry Wt (gm): **7830**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	295	295	3.8	96.2	95-100
22.4	2455	2750	35.1	64.9	60-80
11.2	1350	4100	52.4	47.6	40-60
4.75	1210	5310	67.8	32.2	25-40
2.36	800	6110	78.0	22.0	15-30
0.600	710	6820	87.1	12.9	8-22
0.075	595	7415	94.7	5.3	0-8

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Job No.: CTCE/BBMP/W.No.08/HJSR/WMM/AIV/2016-17 04.07.2016

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. H.J. Sanjay Reddy,** # 4, 9th K Main, Hosahalli, Vijayanagara, Bangalore - 40.
Name of the Work	Improvements to cross roads and drains near Kalpatharu Apartments and Srinidhi Badavane Opp. to Tatanagar in Ward No. 08, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	BBMP/EE/BTP/WO/333/2015-16 Dated: 24.03.2016
Sample ID	WMM Layer
Type of Mix	Wet Mix macadam
Date of Testing	04.07.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	379	383	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	80	84	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	299	299	
4	Aggregate Impact value = percent fines	21.11	21.93	
	100* (W_2/W_1)%			**21.52**

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.08/HJSR/SDBC/AIV/2016-17 13.07.2016

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. H.J. Sanjay Reddy,** # 4, 9th K Main, Hosahalli, Vijayanagara, Bangalore - 40.
Name of the Work	Improvements to cross roads and drains near Kalpatharu Apartments and Srinidhi Badavane Opp. to Tatanagar in Ward No. 08, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	BBMP/EE/BTP/WO/333/2015-16 Dated: 24.03.2016
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	13.07.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	382	385	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	81	84	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	301	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	21.20	21.82	**21.51**

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 24%

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Job No.: CTCE/BBMP/W.No.08/HJSR/SDBC/Shape_T/2016-17 13.07.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. H.J. Sanjay Reddy,** # 4, 9th K Main, Hosahalli, Vijayanagara, Bangalore - 40.
Name of Work	Improvements to cross roads and drains near Kalpatharu Apartments and Srinidhi Badavane Opp. to Tatanagar in Ward No. 08, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	BBMP/EE/BTP/WO/333/2015-16 Dated: 24.03.2016
Technical Reference	IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	13.07.2016

Result : Flakiness Index = **11.37%**

Elongation Index = **13.49%**

Result : Combined Flakiness & Elongation index **24.86%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.08/HJSR/SDBC/Stripping/2016-17 13.07.2016

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. H.J. Sanjay Reddy,** # 4, 9th K Main, Hosahalli, Vijayanagara, Bangalore - 40.
Name of the work	Improvements to cross roads and drains near Kalpatharu Apartments and Srinidhi Badavane Opp. to Tatanagar in Ward No. 08, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	BBMP/EE/BTP/WO/333/2015-16 Dated: 24.03.2016
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	13.07.2016

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.1	3.27	96.73
2	3.3		
3	3.4		

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.08/HJSR/SDBC/Sp_Wa/2016-17 13.07.2016

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. H.J. Sanjay Reddy,** # 4, 9th K Main, Hosahalli, Vijayanagara, Bangalore - 40.
Name of the Work	Improvements to cross roads and drains near Kalpatharu Apartments and Srinidhi Badavane Opp. to Tatanagar in Ward No. 08, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	BBMP/EE/BTP/WO/333/2015-16 Dated: 24.03.2016
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	13.07.2016

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2011	2012	2014	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1256	1257	1259	
4	Weight of saturated surface dry aggregate in air	W_3 g	2009	2013	2016	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	753	756	757	
6	Weight of oven dried aggregate	W_4 g	1998	2000	2002	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.653	2.646	2.645	2.648
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.693	2.692	2.694	2.693
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.55%	0.65%	0.70%	0.63%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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Job No.: CTCE/BBMP/W.No.08/HJSR/SDBC/Bitumen/2016-17 13.07.2016

BITUMEN CONTENT DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AS per IRC : SP : 11 - 1984

CLIENT	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	**Mr. H.J. Sanjay Reddy,** # 4, 9th K Main, Hosahalli, Vijayanagara, Bangalore - 40.
NAME OF THE WORK	Improvements to cross roads and drains near Kalpatharu Apartments and Srinidhi Badavane Opp. to Tatanagar in Ward No. 08, Kodigehalli Sub Division, BBMP, Bangalore.
REFERENCE	BBMP/EE/BTP/WO/333/2015-16 Dated: 24.03.2016
SAMPLE I/D	Roads in Tatanagar, Ward No. 08
DATE OF TESTING	13.07.2016

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	475	474
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25.00	26.00
7. Bitumen content in %	5.00	5.20
8. Average	**5.10**	

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Job No.: CTCE/BBMP/W.No.08/HJSR/SDBC/Gradation/2016-17 13.07.2016

BITUMEN GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS : 2386 and IRC : SP : 11 - 1984

CLIENT	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	**Mr. H.J. Sanjay Reddy,** # 4, 9th K Main, Hosahalli, Vijayanagara, Bangalore - 40.
NAME OF THE WORK	Improvements to cross roads and drains near Kalpatharu Apartments and Srinidhi Badavane Opp. to Tatanagar in Ward No. 08, Kodigehalli Sub Division, BBMP, Bangalore.
REFERENCE	BBMP/EE/BTP/WO/333/2015-16 Dated: 24.03.2016
SAMPLE I/D	Roads in Tatanagar, Ward No. 08
DATE OF TESTING	13.07.2016

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	24.35	5.13	5.13	94.87	90-100
4.75	258.74	54.47	59.60	40.40	35-51
2.36	61.53	12.95	72.55	27.45	24-39
1.18	46.78	9.85	82.40	17.60	15-30
0.3	29.23	6.15	88.55	11.45	9-19
0.075	31.58	6.65	95.20	4.80	3-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	26.62	5.62	5.62	94.38	90-100
4.75	266.35	56.19	61.81	38.19	35-51
2.36	52.82	11.14	72.95	27.05	24-39
1.18	33.94	7.16	80.11	19.89	15-30
0.3	28.36	5.98	86.09	13.91	9-19
0.075	40.87	8.62	94.72	5.28	3-8

Note:

- This test report should not be reproduced except in full, without written approval of the laboratory.
- The results indicated above are based on the tests carried out on the samples received in the laboratory.
- Any Query regarding the report must be reported within 30 days from the date of testing.

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